

Concepts for ECS/LPGS Interface

The following paragraphs describe L1 product ordering, generation and distribution activities with emphasis on the interface between the ECS and LPGS. The proposed concepts are meant to help clarify current understandings between LPGS and ECS developers and provide a dialogue for resolution of details and issues regarding the ECS LPGS interface. Assumptions made regarding various details should be viewed as proposed concepts, and should be discussed further. Billing and accounting activities are not included in the concepts. With the exception of reference to the ECS Client, the terms ECS and LPGS are used rather specifying individual subsystems within the systems that perform certain functions or activities. All LPGS functions are automated, unless operator involvement is explicitly specified.

1. Nominal L1 product generation (end-to-end)

These concepts for nominal L1 product generation focus on the interaction between the ECS and LPGS, and only address internal processing and activities as they directly impact the ECS/LPGS i/f.

Customer Ordering

Nominally, L1 product generation is initiated by a customer order. A customer accesses the ECS client and searches for available L0R data from which L1 data can be processed. The customer submits an order for an L1 product through the ECS Client. The order specifies an L0R product granule, L1 processing or user request parameters, customer billing and shipping information, and product packaging information.

ECS Stages User Request File/L0R Product Delivery Record

Upon receipt of the order, ECS defines product generation requests that comprise the order and consist of separate requests for generation of L1 products corresponding to each L0R product granule identified by the customer. The ECS determines when L1 processing work off queues on ECS/LPGS i/f servers can accommodate additional product generation request processing. When work off queues are at acceptable levels, the ECS generates a user request file (URF)/L0R Product Delivery Record (PDR) containing all user request parameters needed to describe the desired L1 processing, a unique request ID, and the granule ID of the L0R product which will be used in processing. The unique request ID serves as a reference to the L1 products that are generated in response to the product generation request, and provides a means for tracking and correlating L1 products and product generation requests. ECS then places the URF/PDR in a predetermined location on a server known and accessible by LPGS, but controlled and maintained by ECS.

LPGS Retrieval of L0R PDR and L0R product, and Processing L1 Product

At operator specified intervals, the LPGS automatically polls the ECS-controlled server searching for new URFs/PDRs. When a new URF/PDR is detected, the LPGS uses the file transfer protocol (ftp) to retrieve the URF/PDR and stage it on an LPGS server. The LPGS validates and processes the URF/PDR, extracting and verifying the user request parameters to determine needed processing, and verifying that a valid L0R granule ID was received. The LPGS creates a Product Acceptance Notification (PAN), with SUCCESSFUL disposition, and stages it via ftp on a server controlled and maintained by ECS. The ECS processes the PAN, acknowledging LPGS successful processing and retrieval of the URF/PDR. When LPGS processing queues are at acceptable levels, the LPGS creates an acquire request (AR) which identifies the L0R product needed for L1 processing. The LPGS establishes a TCP/IP connection with ECS by sending an authentication request to which ECS responds with an authentication acknowledgment. The LPGS then provides the AR to the ECS via TCP/IP socket connection. The ECS processes the AR, and upon successful validation of the AR, sends an acquire request acknowledgment (ARA) to LPGS via TCP/IP socket. LPGS then initiates termination of the TCP/IP connection. ECS extracts the requested L0R product from its archive and prepares the product files for transfer to LPGS. The ECS creates a Data Availability Notice (DAN) which identifies the product files and the location to which they will be transferred. ECS provides the DAN to LPGS via ftp. The LPGS receives and processes the DAN, and upon acceptance of the DAN and as needed according to readiness for receipt of product files, transmits a data availability acknowledgment (DAA) to ECS via ftp. The LPGS uses the ftp get protocol to pull the L0R product files from the ECS to a server maintained and controlled by LPGS. Upon completion of the transfer of the L0R product files, LPGS performs preliminary quality checks and processing on the L0R data to assure that the product files have been received and are acceptable for higher level processing. The LPGS sends a Data Delivery Notice (DDN) to the ECS via ftp. Upon receipt and validation of the DDN, the ECS then creates a Data Delivery Acknowledgment (DDA) and transmits it to the LPGS using ftp. The LPGS next proceeds to generate the L1 product specified in the user request parameters.

LPGS Stages L1 PDR and L1 Product

Upon completion of L1 product generation, the LPGS stages the L1 product files on a server maintained and controlled by the LPGS. The LPGS next creates and stages a L1 PDR file in a predetermined location, on a server known and accessible by ECS, but maintained and controlled by the LPGS. The L1 PDR contains the names and location of the L1 product files and the unique request ID as a reference to the original product request. The L1 PDR also serves as indication to ECS that LOR staged for processing are eligible for deletion by ECS.

ECS Retrieves L1 PDR and L1 Product, and distributes L1 Product to Customer

At operator specified intervals, the ECS polls the LPGS-controlled server detecting new L1 PDRs. When a new L1 PDR is detected, the ECS uses the ftp to retrieve the file. The ECS validates the L1 PDR information, and prepares to retrieve the L1 product identified by the L1 PDR from the LPGS server. When ready, the ECS pulls the L1 product files from the LPGS server via ftp. After verification that all L1 product files have been successfully received by ECS, the ECS generates an L1 PAN that is pushed to a designated location on the LPGS server. Upon receipt and detection of the L1 PAN, LPGS can mark L1 product files for deletion on the LPGS server. ECS then prepares L1 products files for customer distribution.

2. Product processing status reporting

LPGS does not explicitly provide ECS product processing status messages or data. ECS derives product processing status from URFs/PDRs, PDRDs, PANs, L1 PDRs, and L1 Product files that are provided by LPGS via ftp to ECS. The unique request ID, which each of the files contain, provides the reference for obtaining status of any product generation request derived from a customer order. Extensive delays, or LPGS inability to process product generation requests, will be relayed to ECS manually via the ECS trouble ticket system, or through other verbal/manual means by way of the EDC DAAC operations/shift supervisor.

3. Product generation request cancellation

ECS provides the capability for customers to cancel product orders. Customer cancellation of L1 product orders results in ECS canceling individual product generation requests that resulted from the customer order. Product generation request cancellations are either verbally communicated between ECS and LPGS operators, or manually communicated via e-mail. Clean-up and deletion of interim files and products that relate to the canceled product generation requests are performed manually by the respective system operators.

4. Non-nominal L1 product generation (bad LOR data, bad PDR, bad L1 data transfer)

These concepts for non-nominal L1 product generation focus on examples of the non-nominal messages exchanged between the ECS and LPGS, and do not focus on inaccuracies in customer ordering or science data, or exhaust all possibilities for error. Concepts are written from the perspective of deviations from the nominal process. Where explicit handshaking and session connections are not addressed, the nominal process for establishing communications is assumed. The concepts only address internal processing and activities as they directly impact the ECS/LPGS i/f.

Customer Ordering

For the non-nominal scenario, it assumed that L1 product generation is initiated by a customer order, through the ECS Client i/f without error.

ECS Stages User Request File/LOR PDR

Upon receipt of the order, ECS generates and stages a URF/LOR PDR in a predetermined location on a server known and accessible by LPGS, but controlled and maintained by ECS.

LPGS Retrieval of URF/LOR PDR and LOR product and Processing L1 Product

After detection of a new URF/LOR PDR, the LPGS retrieves the URF/LOR PDR and stages it on an LPGS server. During validation and processing, LPGS extracts the user request information and, for example, determines that an invalid LOR granule ID name was included. In response, the LPGS creates a PDR Discrepancy (PDRD) with disposition indicating INVALID GRANULE ID. The PDRD is staged, via ftp, on a server controlled and maintained by the ECS. ECS detects and processes the PDRD. In response, the ECS regenerates and restages the URF/LOR PDR with the correct/valid LOR granule ID. Through polling, the LPGS detects and retrieves the new URF/PDR, and retrieves and validates the file. In response, the LPGS generates and stages a PAN with disposition indicating SUCCESSFUL processing. When LPGS processing queues are at acceptable levels, the LPGS creates an AR, which identifies the LOR product needed for L1 processing. The LPGS establishes a TCP/IP connection with ECS by sending an authentication request to which ECS responds with an authentication

acknowledgment. The LPGS then provides the AR to the ECS via TCP/IP socket connection. The ECS is not successful in validating the AR, determining that an invalid Data Type was specified. The ECS generates and sends an ARA to LPGS via TCP/IP socket which contains a VALIDATION FAILURE disposition. LPGS processes the ARA, and then resends a corrected AR. The ECS receives and validates the corrected AR, and sends an ARA with SUCCESSFUL disposition. The LPGS then initiates termination of the TCP/IP connection. ECS extracts the requested LOR product from its archive and stages the product files for transfer to LPGS. The ECS creates a DAN and provides the DAN to LPGS via ftp. The LPGS receives and processes the DAN, and determines that the DAN contains an invalid file type. The LPGS creates and ftps a DAA to ECS indicating a disposition of INVALID FILE TYPE. ECS detects and processes the DAA, regenerates the DAN with corrected file type, and transmits the DAN to LPGS via ftp. Upon receipt and successful processing of the DAN, LPGS transmits a DAA with successful processing disposition via ftp. The LPGS uses the ftp get protocol to pull the LOR product files from the ECS to a server maintained and controlled by LPGS. Due to ftp errors, the LPGS is unable to complete transfer of the LOR product files. LPGS generates and creates a DDN, with disposition indicating FTP ERROR, and sends this to ECS via ftp. LPGS then reattempts the file transfer. Upon successful completion of transfer of the LOR files, LPGS performs preliminary quality checks and processing on the LOR data to assure that the product files have been received and are acceptable for higher level processing. The LPGS sends a DDN to the ECS with disposition indicating successful receipt of all LOR files. Upon receipt and validation of the DDN, the ECS then creates a DDA and provides it to LPGS via ftp. The LPGS next proceeds to generate the L1 product specified in the user request parameters.

LPGS Stages the L1 PDR and the L1 Product

Upon completion of L1 product generation, the LPGS stages the L1 product files and creates and stages a L1 PDR file.

ECS Retrieves L1 PDR and L1 Product and distributes L1 Product to Customer

ECS polls the LPGS server detecting and retrieving a new L1 PDR. When attempting to validate the PDR, ECS detects errors in the PVL format of the PDR. ECS generates and provides, via ftp, a PDRD to LPGS with disposition indicating INVALID PVL STATEMENT. Upon detection of the PDRD, LPGS regenerates the PDR with corrected PVL, and stages it on the LPGS server. ECS detects and retrieves the corrected PDR, and prepares to retrieve the L1 product identified by the L1 PDR from the LPGS server. When ready, the ECS pulls the L1 product files from the LPGS server via ftp. ECS checks the file counts and sizes and determines that one product file is smaller than the size indicated in the PDR. ECS repulls the product files and again finds that there is a mismatch between a file size and PDR information. ECS generates a L1 PAN, with disposition indicating POST TRANSFER FILE SIZE CHECK FAILURE which is pushed to a designated location on the LPGS server. Upon receipt and detection of the L1 PAN, LPGS restages the L1 product files, and regenerates and stages the PDR. ECS detects, retrieves and validates the new PDR, and in response pulls the L1 product files from the LPGS, and successfully verifies all files. The ECS then generates and provides a PAN with disposition SUCCESSFUL to the LPGS server. ECS then prepares L1 products files for customer distribution.

5. LPGS Anomaly Analysis

Problems can be presented to the LPGS anomaly analyst through notification from internal LPGS s/w and through receipt of a trouble ticket via the ECS trouble ticket system (TTS). When an anomaly requires regeneration of a L1 product, for which LOR data are no longer available (on the LPGS), the LPGS anomaly analyst may request LOR products for processing using the automated acquire process. The analyst would submit an AR to ECS that, for tracking purposes, would contain the request ID of the originally processed product. After submission of the AR, the nominal handshaking and message exchange of the automated acquire process would be used. When the anomaly analyst detects a problem that is determined to be caused by a problem outside of the responsibility of LPGS, the analyst enters a trouble ticket into the ECS TTS. LPGS-initiated problems are routed through the work flow agreed upon by the DAAC and ESDIS management.